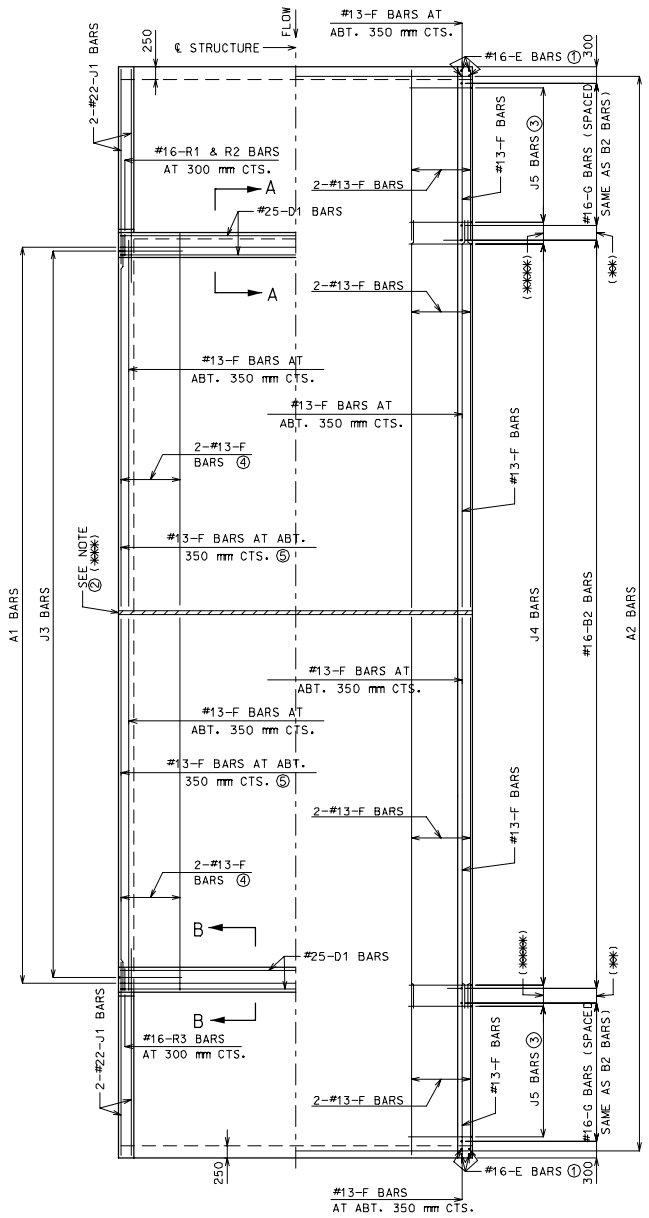
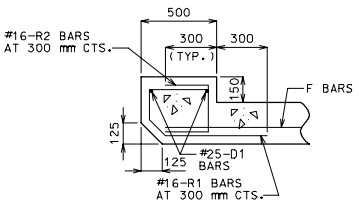
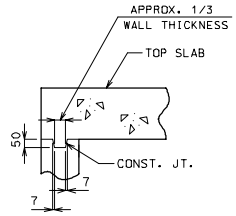
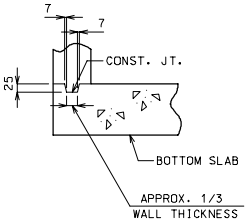


HALF PLAN HALF HORIZONTAL SECTION

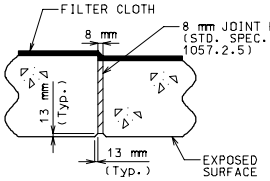


SECTION A-A

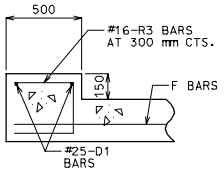




DETAIL OF KEYED CONST. JT.



DETAIL OF TRANSVERSE JOINT THRU BARREL OF CULVERT



SECTION B-B

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

FOR DIMENSIONS AND SIZE AND SPACING OF REINFORCING STEEL, SEE STANDARD SHEET M703.15C.

LAP ALL LONGITUDINAL BARS A MINIMUM OF 610 mm AT SPLICES.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 40 mm UNLESS OTHERWISE SHOWN.

JOINT FILLER SHALL BE SECURELY STITCHED TO ONE FACE OF THE CONCRETE WITH 3.5 mm DIA. (10 GAGE) COPPER WIRE OR 2.8 mm DIA. (12 GAGE) SOFT DRAWN GALVANIZED STEEL WIRE.

BEVELED HEADWALL TO BE LOCATED AT UPSTREAM END.

A FILTER CLOTH 1 METER IN WIDTH AND DOUBLE THICKNESS SHALL BE APPLIED TO ALL TRANSVERSE JOINTS IN THE TOP SLAB AND SIDEWALLS. THE MATERIAL SHALL BE CENTERED ON THE JOINT AND THE EDGES SEALED WITH A MASTIC OR WITH TWO SIDED TAPE. THE FILTER CLOTH SHALL BE A GEOTEXTILE MEETING THE APPROVAL OF THE ENGINEER AND HAVING A GRAB TENSILE STRENGTH OF 800 N. (ASTM D-4632) AND AN APPARENT OPENING SIZE OF 300 TO 150 MICROMETERS (ASTM D-4751). NO DIRECT PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING FILTER CLOTH.

FOR MORE DETAILS AND SECTION THROUGH BOX, SEE M703.10E SHEET 2 OF 3.

① UPSTREAM = 1050 mm
DOWNSTREAM = 1200 mm

② IF MORE THAN ONE TRANSVERSE JOINT IS REQUIRED, SEE STANDARD SHEET M703.12E FOR DETAILS.

③ FOR DETAILS AND REINFORCEMENT IN WINGS, SEE STANDARD SHEET M703.37B.

④ USE THESE BARS FOR DESIGN FILLS OF MORE THAN 610 mm.

⑤ USE THESE BARS FOR DESIGN FILLS OF 610 mm OR LESS.

(**) VARIES – 300 mm MAXIMUM

(***) USE TRANSVERSE JOINT WHEN BARREL IS OVER 25 METERS LONG BETWEEN HEADWALLS.

USE ADDITIONAL TRANSVERSE JOINTS TO PROVIDE 15 METERS MAXIMUM SPACING BETWEEN JOINTS.

DISTANCE BETWEEN INSIDE FACE OF HEADWALL AND TRANSVERSE JOINT SHALL NOT BE LESS THAN 1000 mm.

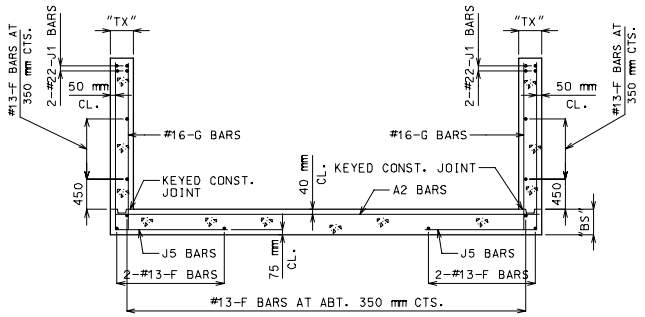
(****) J4 BAR SPACING

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

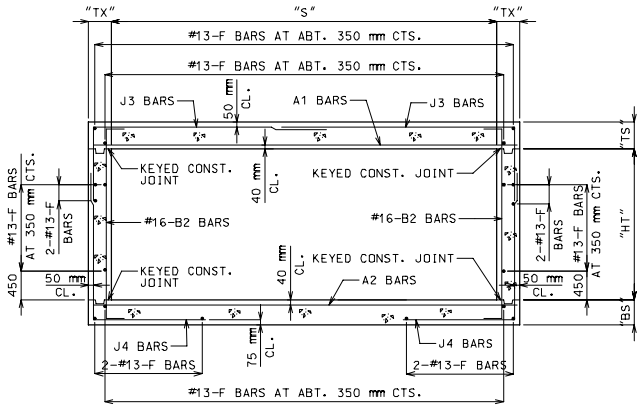
CONCRETE SINGLE BOX STRUCTURE

STRAIGHT WINGS (SQUARE)

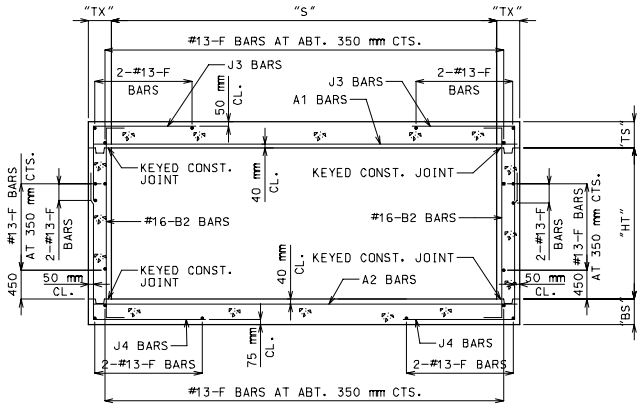
DATE: _____ | EFFECTIVE: 01-01-2003 | M703.10E | 1/3



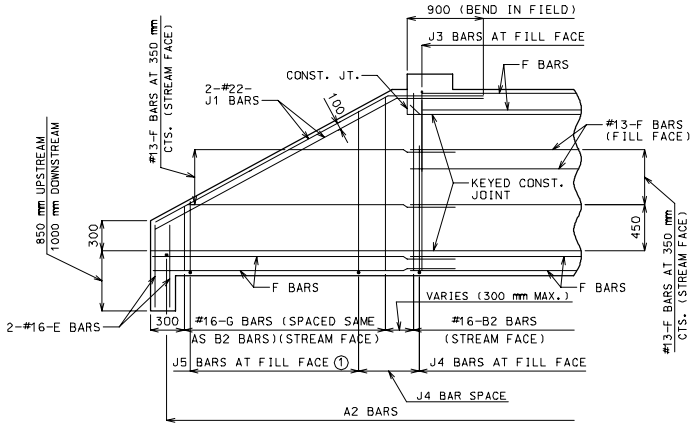
SECTION THRU WINGS



SECTION THRU BOX (DESIGN FILLS 610 mm OR LESS)



SECTION THRU BOX (DESIGN FILLS OVER 610 mm)



ELEVATION OF WING
(UPSTREAM SHOWN)

NOTE: CONSTRUCTION JOINT KEY OMITTED FOR CLARITY.

GENERAL NOTES:

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

J1 BARS MAY BE BENT IN FIELD OR SHOP.

MINIMUM CLEARANCE TO REINFORCING STEEL SHALL BE 40 mm UNLESS OTHERWISE SHOWN.

FOR DIMENSIONS AND SIZE AND SPACING OF REINFORCING STEEL, SEE STANDARD SHEET M703.15C.

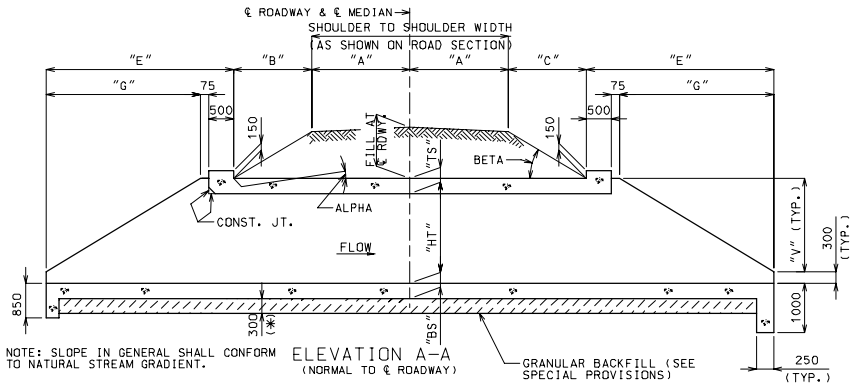
① FOR DETAILS OF REINFORCEMENT IN WINGS, SEE STANDARD SHEET M703.37B.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

CONCRETE SINGLE BOX STRUCTURE

STRAIGHT WINGS (SQUARE)

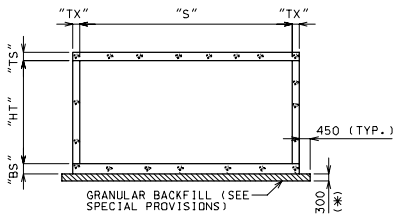
DATE: _____ | EFFECTIVE: 01-01-2003 | M703.10E | 2/3



NOTE: SLOPE IN GENERAL SHALL CONFORM TO NATURAL STREAM GRADIENT.

ELEVATION A–A
(NORMAL TO ℄ ROADWAY)

(*) DEPTH OF GRANULAR BACKFILL MAY VARY. 300 mm USED FOR ESTIMATING QUANTITIES.



SECTION THRU BOX
(NORMAL TO ℄ STRUCTURE)

GENERAL DATA TABLE	
VARIABLE	DIMENSION (mm)
ALPHA	SEE EQUATIONS
BETA	SEE EQUATIONS
"B"	SEE EQUATIONS
"C"	SEE EQUATIONS
"E"	G + 575
"F"	S + 2TX
"G"	2V
"L"	2A + B + C + 2E
"V"	HT + TS - 300

GENERAL NOTES:

DESIGN SPECIFICATIONS:
AASHTO - 1996
LOAD FACTOR DESIGN

DESIGN UNIT STRESSES:
CLASS B-1 CONCRETE f'c = 28 MPa
REINFORCING STEEL (GRADE 420),
fy = 420 MPa

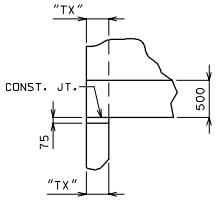
DESIGN LOADING:
EARTH 1900 kg/m³
EQUIVALENT FLUID PRESSURE
4.71 kPa/m (MIN.) - 9.42 kPa/m (MAX.)

ALL DIMENSIONS SHOWN ARE IN mm UNLESS OTHERWISE NOTED.

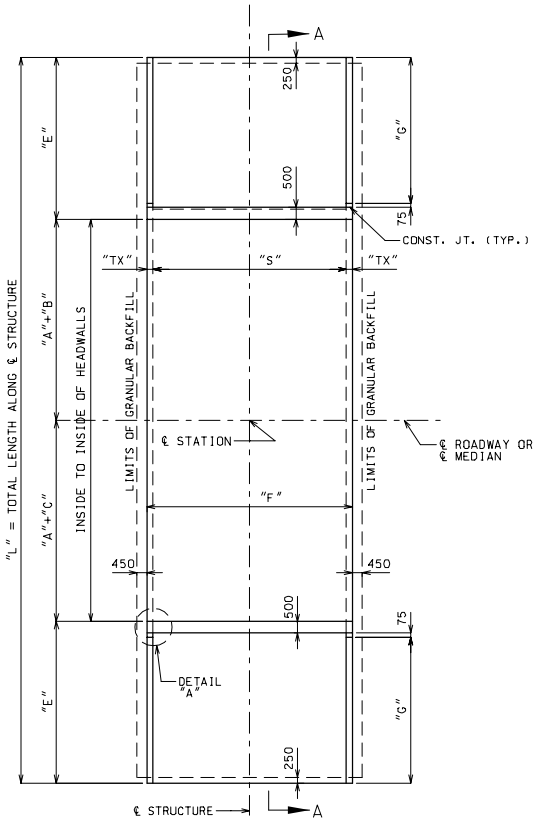
THIS DRAWING IS NOT TO SCALE. FOLLOW DIMENSIONS.

FOR DIMENSIONS NOT SHOWN, SEE STANDARD SHEETS M703.10E, SHEETS 1 & 2 OF 3 OR M703.15C.

NOTE:
WHEN ALTERNATE PRECAST BOX SECTIONS ARE USED, THE MINIMUM BARREL LENGTH MEASURED ALONG THE SHORTEST WALL FROM THE FIRST JOINT TO THE OUTSIDE OF THE HEADWALL SHALL BE 950 mm. REINFORCEMENT AND DIMENSIONS FOR THE WINGS AND HEADWALLS SHALL BE IN ACCORDANCE WITH MISSOURI STANDARD PLANS DRAWINGS.



DETAIL "A"



PLAN SHOWING LAYOUT DIMENSIONS

EQUATIONS FOR COMPUTING LENGTH OF BARRELS

LET ALPHA = ANGLE OF SLOPE OF BARREL WITH HORIZONTAL ALONG ℄ OF CULVERT.

LET BETA = ANGLE OF SLOPE OF FILL NORMAL TO ℄ ROADWAY.

$$\text{"B" OR "C"} = \frac{(\text{FILL AT ℄ ROADWAY}) \pm (\text{CROSS-SLOPE}) \times \text{"A"} \pm \text{A TAN(ALPHA)}}{\text{TAN(BETA)} \pm \text{TAN(ALPHA)}}$$

"B" OR "C" = HORIZONTAL DISTANCE FROM EDGE OF SHOULDER TO HEADWALL NORMAL TO ℄ OF ROADWAY.

DEFINITIONS

CROSS-SLOPE: SLOPE OF EACH PART OF THE ROADWAY INCLUDING ROADWAY CROWN, SHOULDER SLOPE, AND/OR SUPERELEVATION. SEE DESIGN ROADWAY CROSS SECTION FOR LANE AND SHOULDER WIDTHS AND SLOPES.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

CONCRETE SINGLE BOX STRUCTURE
STRAIGHT WINGS
(SQUARE)

DATE: _____ | EFFECTIVE: 01-01-2003 | M703.10E | 3/3